

What is claimed is:

1. A network apparatus connected to at least one other apparatus via at least one transmission medium, comprising:

a band controller for providing an instruction to transmit a control frame that temporarily suspends frame transmission from said at least one other apparatus to said at least one other apparatus; and

a transmitter connected to said at least one transmission medium for transmitting said control frame to said at least one transmission medium according to the instruction from said band controller;

wherein said network apparatus controls the transmission band volume of a frame transmitted from said at least one other apparatus to within a preset band volume.

2. A network apparatus as claimed in claim 1, wherein said band controller periodically instructs said transmitter to transmit said control frame.

3. A network apparatus as claimed in claim 2, further comprising:

a timer for measuring a predetermined transmission interval;

wherein said band controller provides an instruction for the transmission of said control frame each time said

timer measures said predetermined transmission interval.

4. A network apparatus as claimed in claim 1, wherein said band controller instructs said transmitter to transmit said control frame when the transmission band volume of a frame transmitted from said at least one other apparatus exceeds said preset band volume.

5. A network apparatus as claimed in claim 1, wherein said transmitter is provided to correspond to said at least one other apparatus, and includes at least one port connected to said at least one transmission medium; and wherein said transmitter transmits said control frame from said at least one port.

6. A network apparatus as claimed in claim 5, wherein said band controller periodically instructs said transmitter to transmit said control frame.

7. A network apparatus as claimed in claim 5, wherein said preset band volume is set to correspond to the total of the frame transmission band volume transmitted from said at least one other apparatus; and

wherein said band controller instructs said transmitter to transmit said control frame when the total of the frame transmission band volume transmitted from said at least one other apparatus exceeds said preset band volume.

8. A network apparatus as claimed in claim 5,

wherein said preset band volume is set to correspond to each of some of said at least one other apparatus; and

wherein said band controller instructs said transmitter to transmit said control frame to the port provided to correspond to said at least one other apparatus when the transmission band volume of a frame transmitted from said at least one other apparatus exceeds the band volume preset for said at least one other apparatus.

9. A network apparatus as claimed in claim 1, wherein said at least one transmission medium is a full duplex link that allows full duplex communication.

10. A network apparatus as claimed in claim 5, wherein said network apparatus includes at least one said band controller that corresponds to each of some of said at least one port.

11. A network apparatus as claimed in claim 5, wherein said network apparatus includes only one unit of said band controller.

12. A network apparatus as claimed in claim 3, wherein said band controller includes a plurality of registers, and said plurality of registers each retain said preset band volume, a period for which said at least one other apparatus is made to suspend frame transmission, and said predetermined transmission interval.

13. A network apparatus as claimed in claim 4,

further comprising:

a measuring unit for measuring the transmission band volume of a frame transmitted from said at least one other apparatus; and

wherein said band controller further comprises:

a plurality of registers each retaining said preset band volume, a suspension period for which said at least one other apparatus is made to suspend frame transmission, and a traffic observation interval for periodically reading the transmission band volume measured by the measuring unit; and

a timer for measuring said traffic observation interval;

wherein said band controller reads the transmission band volume measured by said measuring unit each time said timer measures said traffic observation time, and if said band controller determines that the read transmission band volume exceeds said preset band volume, said band controller calculates said suspension period and instructs said transmitter to transmit said control frame including said calculated suspension period.

14. A network apparatus connected to a plurality of apparatus via a plurality of transmission media, comprising:

a plurality of ports each connected to one of said

plurality of transmission media, each of said plurality of apparatus being connected to one or more ports of said plurality of ports via one or more transmission media;

a band controller for providing an instruction to transmit a control frame that temporarily suspends frame transmission by each of said plurality of apparatus to each of said plurality of apparatus; and

a transmitter for transmitting said control frame from each of said plurality of ports to each of said plurality of transmission media, according to the instruction from said band controller;

wherein said network apparatus controls the transmission band volume of a frame transmitted from each of said plurality of apparatus to within a preset band volume.

15. A network apparatus as claimed in claim 14, wherein said band controller periodically instructs said transmitter to transmit said control frame to at least one apparatus of said plurality of apparatus.

16. A network apparatus as claimed in claim 14,

wherein said preset band volume is set to correspond to the total of the frame transmission band volume transmitted from said plurality of apparatus; and

wherein said band controller instructs said transmitter to transmit said control frame if the total of

said frame transmission band volume exceeds said preset band volume.

17. A network apparatus as claimed in claim 14, wherein said preset band volume is set for each of said plurality of apparatus in such a way as to correspond to the transmission band volume of a frame transmitted from each of said plurality of apparatus; and

wherein if the transmission band volume of a frame transmitted from any one apparatus of said plurality of apparatus exceeds said preset band volume that corresponds to said any one apparatus, said band controller instructs said transmitter to transmit said control frame to said any one apparatus.

18. A network apparatus as claimed in claim 14, wherein said preset band volume is set for each of said plurality of transmission media in such a way as to correspond to the transmission band volume of a frame transmitted via each of said plurality of transmission media; and

wherein if the transmission band volume of a frame transmitted via any one of said plurality of transmission media exceeds said preset band volume that corresponds to said any one transmission medium, said band controller instructs said transmitter to transmit said control frame from a port connected to said any one transmission medium.

19. A network apparatus as claimed in claim 14,  
wherein said transmitter includes at least one link  
aggregation sub-layer and a plurality of MAC control units;  
wherein said at least one link aggregation sub-layer  
receives an instruction from said band controller and  
distributes said instruction to each of said plurality of  
MAC control units; and

wherein each of said plurality of MAC control units  
corresponds to each of said plurality of ports, and  
transmits said control frame from each of said plurality of  
ports according to the instruction from said band  
controller.

20. A network apparatus as claimed in claim 19,  
wherein said band controller consists of a plurality of  
band controllers, and each of said plurality of band  
controllers corresponds to each of said plurality of MAC  
control units and periodically instructs one MAC control  
unit of said plurality of MAC control units that  
corresponds to itself to transmit said control frame.

21. A network apparatus as claimed in claim 19,  
further comprising:

a byte counter for summing the frame transmission  
band volume transmitted via said plurality of transmission  
media;

wherein only one said band controller is provided

for said plurality of MAC control units, and provides an instruction for the transmission of said control frame when the total of said transmission band volume exceeds said preset band volume.

22. A method of communication between at least one first apparatus and at least one second apparatus connected to said at least one first apparatus via at least one transmission medium, comprising the steps of:

transmitting a frame from said at least one first apparatus;

receiving said transmitted frame by means of said at least one second apparatus;

transmitting a control frame that instructs to temporarily suspend frame transmission to be performed by said at least one first apparatus using said at least one second apparatus;

receiving said control frame at said at least one first apparatus; and

temporarily suspending frame transmission at said at least one first apparatus in response to said received control frame.

23. A method of communication as claimed in claim 22,

wherein the step of transmitting said control frame includes the step of preparing a control frame with a set suspension period for which said at least one first



apparatus is made to suspend frame transmission;

wherein at said suspending step, frame transmission is suspended for said suspension period that is set in said control frame; and

wherein frame transmission by said at least one first apparatus is resumed after said suspension period has passed.

24. A method of communication as claimed in claim 23, wherein at the step of transmitting said control frame, said control frame is periodically transmitted by said at least one second apparatus; and

wherein at said suspending step, frame transmission is periodically suspended according to said control frame that is periodically received.

25. A method of communication as claimed in claim 23, further comprising the step of:

setting a band volume allowable to be used by a frame transmitted from said at least one first apparatus within a range of the communication band volume possessed by said at least one transmission medium;

wherein at the step of transmitting said control frame, said control frame is transmitted when the transmission band volume of a frame transmitted from said at least one first apparatus exceeds said set band volume.

26. A method of communication as claimed in claim 25,

wherein the step of transmitting said control frame further includes the steps of:

measuring the transmission band volume of a frame transmitted from said at least one first apparatus; and

calculating a suspension period when said measured transmission band volume exceeds said set band volume; and

wherein at the step of preparing said control frame, said calculated suspension period is set in said control frame.

27. A method of communication as claimed in claim 26, wherein at the step of measuring said transmission band volume, transmission band volume per predetermined period is measured.